0042990
027588
ERS 96-213

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
DIVISION OF RADIATION PROTECTION
Airdustrial Center, Bldg. 5 • P.O. Box 47827 • Olympia, Washington 98504-7827

February 15, 1996

Mr. David Einan
U.S. Environmental Protection Agency
712 Swift Blvd., Suite 5
Richland, Washington 99352

Dear Mr. Einan:

The Department of Health (the Department) has reviewed the "Proposed Plan for the 300-FF-1 and 300-FF-5 Operable Units, (DOE/RL-95-88, Rev. 0)" (the document)and its supporting documents. These include the "300 Area Process Trenches Modified Closure/Postclosure Plan" (DOE/RL-93-73, Rev. 1), the "Sample Activity Report for Cobalt Sampling at the 300-FF-1 South Process Pond" (BHI-00618, Rev. 0) and the "Phase III Feasibility Study Report for the 300-FF-1 Operable Unit" (DOE/RL-94-49, Rev. 0). The Department has the following comments which primarily concern the 300-FF-1 Operable Unit. 42470 42471 42468 42469

Our primary comment is that the Department supports the Tri-Party agencies' goal of remediating the 300-FF-1 Operable Unit for industrial purposes, however, the Department believes that the choice of a preferred alternative and the establishment of cleanup concentrations cannot be separated from the issues of land ownership, institutional controls and long-term monitoring. In particular, the Department believes the uranium standard of the preferred alternative, namely 350 pCi/g total uranium, may have significant impact upon the groundwater at some time in the future and, therefore, if this alternative is chosen the federal government must retain ownership of the site and maintain restrictions on the use of groundwater. It is important that the document clearly commit the federal government to continued control beyond 2018 if the preferred alternative is chosen. In addition, the document's commitment to monitor the groundwater for only "30 years after remediation is completed" (pg. 6-5 of DOE/RL-94-49) is not adequate to address the potential long-term migration of uranium to the groundwater.

The Department's reservations regarding the preferred alternative stem primarily from an analysis of the discussion of future potential groundwater impacts contained in the technical support document: "Phase III Feasibility Study... (DOE/RL-94-49)". Appendix G of the Feasibility Study, for example, claims that the modeling results "tend to be conservative or overestimate the condition." The Department disagrees. There are a number of parameter

values that were used in the modeling, as documented in the text and Table G-1, that do not appear to be conservative. If the site becomes a research industrial park, for example, it is not unlikely that the site will be landscaped and irrigated as has occurred at the nearby Pacific Northwest National Laboratory. Also, while Appendix G claims that the average post-cleanup concentration of uranium will be approximately 25 pCi/g, there does not appear to be any compelling technical foundation on which this is based.

With the above two parameters in mind the Department repeated the RESRAD calculations of Appendix G with two changes. The annual irrigation rate was changed to 1 meter of water per year, which is a typical application rate in the Tri-Cities area, and the average uranium concentration was changed to 250 pCi/g. The outcome of these changes is that the peak doses from ingesting groundwater change from a few millirem per year to a few hundred millirem per year and the time it takes the uranium to "break through" to the groundwater changes from approximately one thousand years to approximately one hundred years. This result demonstrates the high sensitivity of these dose calculations to modest parameter changes.

There are many other parameters that can have significant impact upon the outcome of the calculations that do not appear to be conservative. These include the well-pump depth, the evapotransporation coefficient and the total and effective porosity of the soils.

It is important to note that the Department is not asserting that there will be significant impact upon the groundwater at some future time. Instead, the Department asserts that if the preferred alternative is chosen, there are sufficient technical grounds to take steps to establish long-term monitoring of the groundwater, maintain federal control of the site and avoid future use of groundwater.

The Department also has additional technical concerns regarding the document's external exposure dosimetry estimates, particularly as they pertain to ^{60}Co. The dosimetry estimates contained in the technical support documents show that the cobalt concentrations that were used as input to these calculations were an average over a very large area (approximately 40,000 m^2). The document's use of the entire South Processing Pond site for this averaging greatly underestimates the potential doses to workers and is the primary reason that the document can erroneously claim that "this level of cobalt-60 will decay naturally to a level of insignificant dose contribution by the time the operable unit is completed."

The choice of an appropriate area over which to average concentrations depends upon two factors. These are the typical area over which the reasonably maximally exposed work would range at the site and the area of contamination which would contribute most of an external dose. For the former, the maximum appropriate area is the size of a facility built on the site. For the

latter, the dose an individual would receive from a uniform concentration of gamma-emitters in soil is dominated by the contribution from soils within 30 meters of the individual, while doses from soils further away is almost negligible. This effect is shown, for example, in Figure 6.2 of the Nuclear Regulatory Commission's "Residual Radioactivity Contamination From Decommissioning" (NUREG/CR 5512). The implication of this effect is that for the purposes of external exposure dosimetry one should not average concentrations over areas larger than approximately 1,000 m^2. Most state and federal radiological cleanups use an area of 100 m^2 for such averaging unless site-specific conditions, such as an industrial scenario, justify a larger area. This is documented in the Nuclear Regulatory Commission's NUREG/CR 5849. If one applies this protocol to the data in Figure 2 of the Sample Activity Report for Cobalt, one finds that the highest average concentrations are approximately 60 pCi/g. This concentration will not be negligible in comparison to 15 mrem/yr by the year 2018. Even if one allows for an averaging area of 1000 m^2, the resulting maximum concentrations will not be negligible by 2018. Thus the Department does not believe that a soil cleanup standard based solely upon doses from uranium is technically defensible without a careful assessment of the concentrations of 60Co that will remain after remediation. The same considerations apply to the external exposure dosimetry of uranium.

Another concern of the Department arises from the Phase III Feasibility Study's assertion that "when uranium (350 pCi/g) is removed, all potential chemical contaminants will also be removed..." (see page ADD-4). Despite this claim, the analysis to demonstrate such correlations, or a correlation between uranium and ^{60}Co, is not present in that document or any of the documents reviewed by the Department. If verification of the cleanup will rely on such correlations between contaminants, it is essential that these correlations be carefully documented.

The Department also noticed that there seem to be quality assurance problems in the data contained in the technical support documents. The "Process Trenches" (DOE/RL-93-73) report, for example, shows that all of the isotopic uranium analyses, which presumably were done by alpha spectroscopy, were rejected as unusable data (see Appendix 7D of the report). Despite this, all of that data appears in Table 4-3 of Chapter 4, with no acknowledgment of this quality assurance problem. How is it possible that all of the isotopic analysis of the most important site contaminant is rejected as unusable? How is it possible that data that was rejected as unusable is used in the analysis of the site with no apparent reservation?

In conclusion, the Department supports the Tri-Party Agencies' approach of the preferred alternative if certain additional institutional controls are established. These include a commitment by the federal government to maintain control of the site and maintain restrictions on the use of the site's groundwater. In addition, the Department believes that some of the

technical analysis in the supporting documents is sufficiently flawed or inadequately documented that additional analysis or documentation should be performed.

If you have any questions concerning these comments, please call me at 360-586-3306.

Sincerely,

John L. Erickson, Head
Environmental Radiation Section

JLE:DPW:KP

cc: Ted Wooley, Ecology
Robert McLeod, DOE
Ralph Patt, HAB